

# PROBLEMS OF POSTOPERATIVE MASTOID CAVITY: AN INSIGHT

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## INTRODUCTION

Open cavity mastoidectomy or canal wall down mastoidectomy is one of the main techniques in cholesteatoma surgery. The perceived advantage is that it has a lower rate of recurrent and residual cholesteatoma compared to intact canal wall mastoidectomy.<sup>1</sup>

The perceived disadvantage is that the open mastoid cavity accumulates cerumen that requires regular cleaning, and the cavity may be intolerant to water.<sup>2</sup>

First formal description about opening the mastoid dates back to 1774, when posthumously, the work of Jean Louis Petit was published.<sup>3</sup> In 1873 Hermann Schwartze and Adolf Eysell described cortical mastoidectomy.<sup>4</sup> It was the first systematic description of how and under what conditions the procedure should be performed. Ernst Kuster in 1888 presented the idea of radical mastoidectomy. Gustave Bondy in 1910 came with the idea of doing a radical job and at the same time, preserve the hearing and thus gave rise to modified radical mastoidectomy.

With the development of mastoidectomies more and more

of them were being performed. Intact canal wall mastoidectomies did not carry problems of cavity because they were not creating them. Canal wall down mastoidectomies, where the posterior canal wall was brought down resulted in more number of postoperative cavities, which had their inherent adverse effects on the quality of life of patients.

**Problem of discharge :** Most common problem which is associated with mastoid cavity in the immediate postoperative period, is that of persistent discharge. It is found in almost all cases but significant amount of discharge is found in 20% to 60% of cases.<sup>5</sup> Source of discharge is not the mucosa but it is actually the leaking tissue fluid from the mastoid bone. Seeing the discharge and its duration, the patients are often unable to justify their decision for being operated. Discharge is usually copious. Discharge often trickles down the ear onto cheek and looks embarrassing. The patient has to frequently mop his ear. In the usual course, the discharge gradually decreases in amount with the passage of time. As an average the discharging ear converts to near dry ear in a couple of months.



**Fig 4 : –** Eight yrs child operated at NMCH for COM active Squamous type having (A) large cavity which was obliterated using posteriorly based flap (B) same patient 6 weeks postoperatively with a much smaller cavity but having discharge.

Current treatment options for cholesteatoma are medical management of superimposed infection with topical antibiotic eardrops and surgical management in the form of either Canal wall up (CWU) mastoidectomy or Canal wall down (CWD) mastoidectomy. The first operation has a low to intermediate risk for otorrhoea but has an increased risk of cholesteatoma recurrence (30-63%). The risks for canal wall down mastoidectomy are reversed – lower risk of recurrence (2-10%) but higher risk of otorrhoea (20-60%) (see Fig 1).<sup>6</sup>

During the period when the ear is discharging some patients prefer to keep a cotton ball and let it get soaked and change it periodically. Some patients report to the surgeon repeatedly and seek remedy for their discharging ear. Proper counseling and reassurance, that in due course of time their discharge will settle down, consoles the patients. Discharge settles when the epithelium starts growing and covers all over the mastoid cavity. The smaller the cavity is, the faster is the complete covering of the cavity with epithelium. There can be instances when the epithelialization never gets completed and for this a persisting infection or a residual disease should be blamed.

**Problem of infection :** Recurrent infections of the postoperative mastoid cavity can either be bacterial or fungal. A combination of fungal and bacterial components is more common. The exposed bone of the mastoid leaks tissue fluid, which is a rich medium for bacterial growth. Unlike other areas of head and neck, the mastoid, and in particular sclerotic mastoid, is not well vascularized. The combination of weeping tissue fluid and mediocre blood supply makes controlling bacterial growth challenging.

**Problem of retained debris :** A large cavity with comparatively small meatoplasty creates a problem for the debris to be cleared out from the cavity. These patients have to regularly get their mastoid cavities cleaned up. While doing a canal wall down procedure, attempts are made that the cavity created retains the self-cleaning nature. However, in a fair number of cases, the postoperative cavity is not self-cleaning and lifelong postoperative care is required at regular intervals, for removing the debris from the cavity. The retained debris often get hard enough that some wax solvent is needed before attempt for removal is made. Cleaning in early postoperative period should be avoided. If strong indication for cleaning mandates intervention, it should be very gentle and under direct vision as incidences where graft comes out with the debris are well known.

**Problem of ugly look :** A wide meatoplasty and a large cavity do not look decent. Often the patients express uneasiness to adjust in their social environment with a large ear opening. The defect created is quite obvious and many patients are questioned by their associates, which annoys the patient. If the patient is operated for a unilateral disease, there is great disparity between the two ear openings, which disturbs the patient further.

A large mastoid cavity can result in pinna being drawn inwards causing an obvious deformity. This adds to the existing wide meatus related problems of the patient.

**Problem of vertigo attacks :** An open mastoid cavity exposes the contents to the environment. The pressure and temperature changes in the environment are directly transmitted to the labyrinth leading to vertigo. The condition of open mastoid cavity, which is exposed to external environmental pressure and temperature changes simulates caloric test, where deliberately temperature changes are created in the external auditory canal and allowed to be transmitted to the inner ear. This poses great difficulty while swimming. Patients with an open mastoid cavity who are sensitive to external pressure and temperature changes cannot swim, which adds to the morbidity. Diving is prohibited for these patients.

**Problem of fitting hearing aid :** Fitting a hearing aid in patients having a postoperative mastoid cavity is a challenge. This difficulty arises due to two reasons. Firstly the ear canal is full of discharge and applying hearing aid to such ear is not feasible. By the time discharge dries up we lose precious time and there is further hearing loss due to stimulus deprivation. Secondly even if the ear gets dry it is difficult to find an ear mold for such a wide ear canal. The hearing aid tends to fall off as there is no anchorage to hold it in place.

**Problem of Perichondritis :** Perichondritis is a serious infection in the lining of the outer ear cartilage that rarely develops after enlarging the opening the external ear canal during mastoid surgery.

**Problem of hearing loss :** Final hearing gained after staged ossiculoplasties in patients who have undergone canal wall down mastoidectomies is usually 5-10 dB worse than patients who underwent canal wall up mastoidectomy due to ineffective sound transmission.

**Problem solving :** Once we have a postoperative cavity with problems, it is very difficult to eradicate those problems. Best way to avoid the problems is to avoid the cavities. Nevertheless, if the cavity is created and it has problems which are refractory, a revision surgery can be planned.

For problems of retained debris 3-6 monthly visit to ENT specialist will suffice. In cases where there is recurrent infection antibiotic drops will help unless the recurrent infection is not due to residual disease. Diluted vinegar is of great help to get rid of cavity problems.

**Reducing the number of cavities :** By reducing the number of cavities I mean to say that we should avoid open cavity mastoidectomies as far as possible. Intact canal wall mastoidectomy should be preferred, of course not at the cost of leaving residual disease.<sup>6</sup> Inside-out mastoidectomy, where we proceed from within the canal towards the attic and antrum, is an attempt to avoid cavities as we reconstruct



the outer attic wall and thus avoid the development of cavity and subsequent cavity problems.

**Reducing the size of cavities :** This is the most commonly practiced method and harbors a wide range of options. Size of mastoid cavity is reduced by partial obliteration of the cavity with some biocompatible substance.

**Mastoid obliteration procedures can be classified into two main categories:** (a) Free grafts, which are further subdivided to biologic and non-biologic and

(b) Local flaps.

Cortical bone pate, allogeneous/autogenous bone chips, cartilage, fat and fascia come under the category of biological free grafts. The cartilage is often harvested from the conchal cartilage whereas cortical bone pate is obtained from the lateral mastoid cortex.

Hydroxyapatite crystals, calcium phosphate, ceramic granules and bioactive glass ceramic are certain non-biological free graft materials.<sup>7</sup>

Pedicle flaps resurface the cavity, covering raw surfaces that interfere with re-epithelialization. Their robust blood supply also ensures a conductive surface for epithelial migration. Several types of flaps have been described, including the Palva flap (Meatally-based musculoperiosteal flap), middle temporal artery flap, Hong Kong flap, temporoparietalfascial flap (TPFF), pedicled superficial temporalis fascial flap, postauricular-periosteal-pericranial flap, temporalis muscle flap, inferiorly based fascioperiosteal flap and postauricularmyocutaneous flap (see Fig 2). Often a combination of various techniques is used to achieve the most favorable result.<sup>8-11</sup>

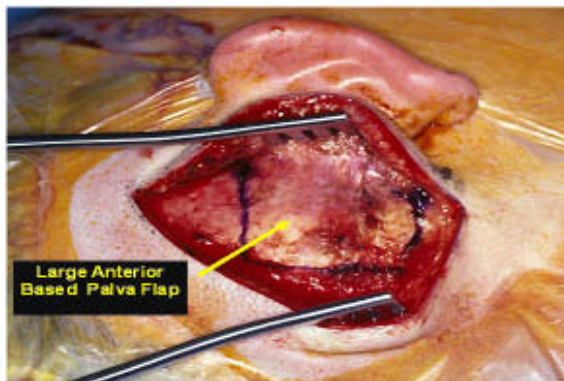


Fig 2 : – Large anterior based Palva flap shown with marking

## CONCLUSION

Postoperative mastoid cavity having problem, is something which disheartens the surgeon, even after an excellent job at disease level. Currently, it is difficult to cure the problems of cavities completely and effectively. Thus, one must try to avoid making a cavity and perform intact canal wall mastoidectomy, if feasible. At times when

avoiding a cavity becomes unmanageable, one must make attempt to reconstruct the posterior canal wall. Inside out mastoidectomies should be encouraged as they follow the disease and remove it with an option to reconstruct the outer attic wall and avoid cavity problems.

When we give an open mastoid cavity to any of our patient we must give extensive postoperative tender care to them and follow them with affection. This builds their trust in the treatment and they understand better the nature of disease and consequences which led to creation of cavity.

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